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GENERAL NOTES.

GEOLOGY AND PALÆONTOLOGY.

American Triassic Rhynchocephalia.—The reptilian genus Typothorax was described by the writer in 1875 in the report of Captain G. M. Wheeler to the Chief of Engineers, U. S. A., from peculiar osseous dermal plates, which he found in the Triassic bad-lands of New Mexico. Additional material recently examined furnishes a good deal of information as to the characters of this form, and indicates that its position is somewhere near to the genus Aëtosaurus of Fraas, in the order Rhynchocephalia. This is an important addition to American palæontology, since undoubted members of this order have not been hitherto found on this continent, excepting perhaps the Champsosauridæ.

The pieces, which belong undoubtedly to the type species, *Typothorax coccinarum* Cope, include two ribs with corresponding dermal scuta, two femora, and some loose dermal scuta. There are probably other parts of the animal preserved. The ribs are remarkable for their wide expansion, so that their edges meet, forming a continuum; but they are not joined suturally. Each rib is overlaid by a band-like dermal scutum of similar length and width. The inferior face of one edge of the dermal scutum is bevelled so as to make a gaping groove, while the plate and rib are obtuse and appressed at the opposite edge. This edge is probably received into the gaping edge of the adjacent pair of bones, thus forming an uninterrupted cuirass, as in the armadillo. The femur is curved, with a third trochanter and a bilobate external condyle. No distinct great trochanter. The dermal armature resembles that of Aëtosaurus, but differs in being in continuous bands, instead of being subdivided by cross-sutures. The ribs of Aëtosaurus are not represented as expanded by Fraas; but we do not know the characters of all of them in either genus. The surface of the scuta is sculptured into shallow pits in *Typothorax coccinarum*. The species is as large as the Mississippi alligator.

This genus offers an interesting parallel in the structure of its carapace to the early stage of the same part in some of the tortoises. The incomplete fusion of the ribs and the distinctness from them of the dermal osseous deposit, are conditions of embryonic stages in that order. There can be little doubt but that more complete knowledge of this genus and its allies will throw light on the origin of the order of Testudinata.

It is important to observe that, like the Aëtosaurus in Würtemberg, the Typothorax accompanies the genus Belodon in the beds near the summit of the Trias.—*E. D. Cope.*

Some New Tæniodonta of the Puerco.—A right mandibular ramus from the upper beds of the Puerco formation in New Mexico indicates a species of Psittacotherium different from the two hitherto known (Hayden's "Report U. S. Geol. Surv. Terrs.," iii., Bk. I., p. 196, 1885), and of larger size. One cutting anterior tooth (the supposed external incisor) is preserved, and the alveolæ of all the molars, with the entire second molar free from the jaw. These fragments indicate the most robust of all incisor-biters known, and an animal capable of doing great execution with the front teeth. The depth of the ramus at the symphysis is remarkable, equalling the length of the entire molar series *plus* half the long diameter of the incisor. The long diameter of the incisor equals the space occupied by the anterior three molars; in *P. multifragum* this diameter covers but two molars. The enamel of the incisor is smooth; in *P. multifragum* it is grooved. The premolar preserved is similar to that of the *P. multifragum* in form, but is larger; it consists of an external larger and an internal smaller conical cusp and a single compressed root; the inferior border of the enamel angulating upwards on each side. Length of entire dental series, m. .095; diameters of incisor,—anteroposterior, .028; transverse, .016; depth of symphysis, .085; depth at fourth molar, .050; diameters of second molar (premolar),—anteroposterior, .010; transverse, .017; elevation of external cusp, .018.

This species may be named *Psittacotherium megalodus.*

The anterior part of the palate, with two of the characteristic teeth of the *Psittacotherium multifragum*, supplies a hiatus in our knowledge of the genus. A powerful rodent-like incisor occupies the inner edge of the premaxillary bone. It is narrowed and produced posteriorly, but the enamel only covers a narrow part of each side besides the front, the entire surface being without angles. Enamel rugulose and delicately grooved. Posterior to this tooth is a diastema about as wide as its crown. This space is succeeded by a huge tooth in the position of a canine, but whether truly such is uncertain. Its section is oval, and the long axis is directed obliquely outwards and forwards. Its enamel is delicately rugose and grooved, but a wide open channel on the anterior half of the external face is the most conspicuous peculiarity. The apex of the crown is lost. No diastema behind this tooth. The dimensions of this tooth are about those of the external incisor of *Psittacotherium multifragum*, and the enamel is similarly marked.—*E. D. Cope.*

Mr. Hill on the Cretaceous of Texas.—In our February number we referred to the reading of a paper by Mr. Robert Hill, of the United States Geological Survey, on the Cretaceous formations of Texas. In this paper Mr. Hill makes the important announcement of his discovery of a series of beds below the

Dakota formation, which fill the extensive hiatus which has hitherto existed in American geology in the region of the lower Cretaceous. The text of this paper having come to hand in the *American Journal of Science and Arts* for April, further observations on it are possible. The formations discovered below the Dakota are referred to a single series, under the name of the Comanche. This is divided into two divisions, which receive new names; and these are again subdivided lithologically into five and four subdivisions respectively, several of which have been previously named by Marcou and others. The Comanche series is said to be "one of unbroken sedimentation and faunal continuity from base to top." We fail to perceive, therefore, why they should be arranged in two divisions, each of which receives a new name, the more as no characters, faunal or lithological, are cited in support of them.

In the same paper the Upper Cretaceous beds of Texas are reclassified, and the whole are arranged in an upper series, which includes the Cretaceous formations of the Gulf States. To this body of formations the name "Gulf Series" is given. We must protest against the introduction of this name also, not only because no characteristic definition of the division is given, but because we believe that no such definition is possible. The Cretaceous of the Atlantic States is susceptible of intercalation with the beds of the Gulf States, and the name "Gulf Series" is not only inappropriate for them, but any name for them as a whole is unnecessary. This is because the Atlantic beds can be intercalated with those of the interior of the continent. That some of the Texan beds are identical with some of the latter is well known. Thus the Niobrara epoch is well represented in Northern Texas both by its well-known vertebrate fossils and its characteristic chalk, a fact apparently unknown to Mr. Hill.

The Upper Cretaceous series is divided by Mr. Hill into four divisions, named respectively (beginning at the top) Navarro beds, Dallas Limestones, Eagle Ford Shales, and Timber Creek group. Of these the first two are probably identical with the Riply and Rotten Limestone beds of Mississippi and Alabama, and the Eagle Ford Shales are likely to prove to be the same as the Eutaw group of Hilgard, Tuomey, and others. The name "Timber Creek" is already in use for a division of the Upper Cretaceous in New Jersey. This duplication of names is not sustained by any reasons, but, on the contrary, the writer refers to previous determinations by Shumard, without correction.

There is enough good and new work indicated in this paper to satisfy the ambition of a discoverer, and to attract the attention and interest of geologists. But the author has failed to appreciate the importance of observing the ordinary rules of nomenclature to a degree which is surprising.—*E. D. Cope.*